Committee on Resources

Subcommittee on Fisheries Conservation, Wildlife and Oceans

Statement

**WRITTEN TESTIMONY OF
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U.S. DEPARTMENT OF COMMERCE
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SUBCOMMITTEE ON FISHERIES, CONSERVATION, WILDLIFE AND OCEANS
COMMITTEE ON RESOURCES
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INTRODUCTION

Good morning, Mr. Chairman and members of the Subcommittee. My name is Ted Lillestolen and I am the Deputy Assistant Administrator for the National Ocean Service, National Oceanic and Atmospheric Administration (NOAA) for the Department of Commerce. I am here today to testify about the NOAA response efforts following the aircraft tragedies over the past several years. I am accompanied today by Admiral Evelyn Fields, Director of NOAA's Office of Marine and Aviation Operations. It is unfortunate that such circumstances have brought us here today. NOAA has played an important role in aiding the National Transportation Safety Board (NTSB), the Federal Bureau of Investigation, the U.S. Navy, the U.S. Coast Guard and all the other Federal and state agencies that have been involved in these response efforts over recent years.

NOAA Mission

As the Nation's primary marine resource trustee and steward, the National Oceanic and Atmospheric Administration has a wide variety of roles and responsibilities in the marine environment. From forecasting marine weather to delivering satellite information to providing information on water levels and exploring and mapping deep water regions, to managing the nation's fisheries and protecting vital marine areas, NOAA is actively involved with understanding and protecting the Nation's oceans.

Established in 1807 by Thomas Jefferson, NOAA's Office of Coast Survey has been making nautical charts of U.S. waters for almost 200 hundred years. NOAA carries out this mission and provides many related products and services critical to safe navigation. Today, NOAA maintains a suite of about 1,000 charts of U.S. waters. The nautical chart provides a graphic portrayal of the marine environment allowing mariners to fix positions and plot an efficient course while avoiding rocks, shoals, reefs, tide rips and other known hazards. These charts indicate depths acquired through hydrographic surveys, but also depict the position of the shoreline, bridges, underwater cables and pipelines, aids to navigation, the nature of the ocean floor and other information vital to safely traversing coastal waters.

Much of this chart data comes from sources outside NOAA. Suppliers of information include the Army Corps of Engineers regarding conditions and depths of the many Federal channels it maintains, the U.S. Coast Guard, regarding the position of aids to navigation and Notices to Mariners, the Department of Defense, marine pilots, commercial mariners and recreational boaters. Every year, based on the tens of thousands of reports we receive, including more than 1,000 notices of wrecks and other obstructions per year, NOAA makes upward of 20,000 chart revisions.

NOAA is responsible for surveying the waters of the United States Exclusive Economic Zone (EEZ) -- about 3.2 million square nautical miles -- in support of safe navigation. Historically, soundings for nautical charts were acquired by lowering a lead line over the side of a boat until it hit the bottom and then measuring the line. This was replaced by single beam sonar which, although much more efficient, still only provided data for a single point on the ocean floor. In the past decade, the development of side-scan and multi-beam sonar technologies has allowed for determining the depth of entire swaths of the ocean floor, revealing all obstructions to navigation. In combination with accurate positioning technology--the Global Positioning System (GPS)--ocean features can be precisely surveyed, positioned and charted in three dimensions. However, more than half of the soundings depicted on NOAA charts today were acquired prior to 1940, with older, less accurate technologies.

The volume of marine commerce and the draft of vessels have increased by about two-fold in the last 50 years. Modern commercial ships regularly draw more than 40 feet of water. Knowing precisely how much water is under a ship's keel is becoming increasingly critical to both safety and the competitiveness of U.S. exports. The Coast Guard and local authorities require accurate real-time water-level data for administering under-keel clearance requirements and for providing vessel traffic services.

Historically, water level information was provided in official tide and current tables produced by the government; programs that were placed in NOAA when it was created. Like nautical charts, current editions of tide tables must be carried by all vessels over 1,600 gross tons. However, such tables provide only predicted conditions based on astronomical effects such as the gravitational pull of the sun and moon. They do not and cannot account for the often-significant effects of winds, river flow, atmospheric pressure or water density. For example, a significant shift in winds alone can alter water levels by as much as several feet from predicted levels, resulting in either increased risk of groundings or inefficient use of vessel capacity.

To account for such impacts and to monitor actual water levels over the long term, NOAA maintains a system of stations called the National Water Level Observation Network (NWLON). This network underpins the determination of Mean Lower Low Water, which is the conservative reference point used to calculate all hydrographic soundings on nautical charts. Manual gauges have been replaced and continue to be upgraded with more advanced systems that can transmit readings in real time. Building upon these and other technological advances, NOAA has developed the Physical Oceanographic Real Time System (PORTS). PORTS is a decision support tool which improves navigation safety and efficiency. PORTS consists of an array of sensors strategically located throughout a port. The sensors feed data into a central computer designed to integrate and deliver highly accurate data on actual water levels, currents, winds and other critical oceanographic and meteorological information directly to mariners in near real time. The information can be accessed directly by modem or via phone and can be readily assimilated into the Electronic Chart Display and Information Systems (ECDIS). NOAA has designed, and resources permitting, will implement a 24-hour-a-day quality assurance system to support its real-time services called the

Continuous Operational Real-Time Monitoring System (CORMS).

The Coast Guard has primary responsibility to provide GPS stations in support of marine navigation. However, NOAA houses the Office of the National Geodetic Survey, which is responsible for the GPS-based National Spatial Reference System that provides the underlying quality control and foundation for all civilian GPS applications. Coast Guard GPS stations are incorporated into the larger, national system of ground-based reference stations that is quality controlled by NOAA. NOAA currently is engaged in a height modernization effort that is using GPS technology to develop and implement an improved capability to determine accurate positioning in all three dimensions. When fully implemented, mariners will have the tools to determine, in real time, the underkeel clearance from the channel bottom and the "air gap" or the clearance of a ship's superstructure beneath bridges, helping to ensure safe and efficient passage

Since NOAA's beginning, a large percentage of its oceanographic, atmospheric, hydrographic, fisheries and coastal data has been collected on NOAA ships and aircraft. This fleet of platforms is managed and operated by the Office of Marine and Aviation Operations, formerly the Office of NOAA Corps Operations (ONCO). This office is made up of civilians and officers of the NOAA Commissioned Corps (a uniformed service of the United States). In addition to research and monitoring activities critical to NOAA's mission, NOAA ships and aircraft provide immediate response capabilities for unpredictable events, such as search and recovery efforts after the TWA Flight 800 crash, damage assessment after major oil spills such as the Exxon Valdez, the New Carissa and the Persian Gulf War. The fleet ranges from large oceanographic research vessels capable of surveying the world's deepest ocean, to smaller ships responsible for charting the shallow bays and inlets of the United States. The fleet supports a wide range of marine activities, including fisheries research, nautical charting/mapping, and long-range ocean and climate studies.

As part of its oil spill response capabilities, NOAA has developed expertise in oil spill trajectory modeling capabilities which are used in support of Coast Guard's responses to oil spill and hazardous materials accidents. This type of modeling is complex incorporating a number of techniques developed by NOAA experts and physical oceanographic expertise applied on a case by case basis. This modeling can provide vital information on forecasting the highest probability paths for the spilled materials. NOAA provides the forecast based upon expert interpretation of a wind field and current display produced by interpreting and incorporating thermal imagery on Gulf Stream location with associated eddies, other recent current data, and weather (wind speed, direction, sea state).

NOAA's National Data Buoy Center supplies a network of about 60 buoys and 60 C-MAN stations are located in coastal waters around the county and help meet forecasters' need for frequent, high-quality marine observations for marine and coastal forecasts. All stations measure wind speed, direction, and gusts; barometric pressure; and air temperature. All buoy stations and some C-MAN stations also measure sea surface temperature and waves.

NOAA's Marine Prediction Center has the primary responsibility for issuing marine warnings, forecasts, and guidance for maritime users. The Center quality controls marine observations from ships, buoys and other sources before assimilating them into its computer models. The Center also works with NOAA's National Hurricane Center in forecasting tropical storms in parts of the Atlantic. The services of the Center help to fulfill U.S. obligations under the Safety of Life at Sea Convention (SOLAS) and the World Meteorological Organization. Other special weather products are also produced, upon request, to support U.S. Coast Guard rescues and special field operations. The Center's services help to protect life and property, improve safety at and location data from activated beacons to the Coast Guard, Civil Air Patrol, U.S. Air Force and search and rescue teams around the world. Russia's system, COSPAS, is now a part of the same system. NOAA's

National Environmental Satellite, Data, and Information Service (NESDIS) operates the United States Mission Control Center, and serves as the focal point of U.S. COSPAS/SARSAT alert data. NOAA also coordinates related spacecraft operations. In the U.S. alone, at least 3,700 lives have been saved as of April 19, 1999. The system has supported the rescue of 67 persons in the U.S. so far this year.

Post Event Response

Under maritime law, NOAA can be called upon to respond to disasters. We have a wide range of expertise and capabilities that can aid in any effort and NOAA has been called for this reason following a number of disasters. More recently, we have supplied support in recovering vital data for aircraft tragedies off the east coast: the downing of TWA Flight 800 in 1996, the more recent tragedy involving John F. Kennedy, Jr. this past July, and now the loss of EgyptAir Flight 990. NOAA has worked to supply the other agencies on-scene whatever aid we can to ensure recovery in a timely manner. In each case, NOAA has been requested by the agency in charge for assistance: Coast Guard asking us for aid in search and rescue operations or the NTSB in search and recovery operations.

In July 1996, the NOAA Ship RUDE was in the area when TWA Flight 800 went down off the coast of Long Island and was one of the first ships to respond. The RUDE joined the U.S. Coast Guard Cutters ADAK and JUNIPER at the scene in searching for any possible survivors and played a key role in the location of the wreckage. The RUDE was able to supply the outline of the debris field using its towed sidescan sonar system (EG&G 260/272). Using a prototype shallow water multibeam sounding system (Reson SEABAT 9001) over the debris field, the RUDE was then able to conduct detailed surveys of the debris field. By using the Differential Global Positioning System, RUDE was able to establish its positions to an accuracy of 3 to 5 meters. This information was used by Navy divers for planning recovery operations to provide its divers with the best information in their efforts. NOAA also provided trajectory analysis to aid searchers in locating floating debris, and NOAA's meteorologists provided accurate tailored local forecasts and wind and sea state predictions. The recovery efforts following this tragedy were a joint effort by all the agencies on site and it is due to the team work displayed that the recovery efforts were successful. With the experience and expertise of the crew aboard the RUDE in conducting hydrographic surveys, NOAA was able to provide vital information for this team effort.

Following the crash of the Piper Saratoga carrying John F. Kennedy, Jr, his wife, and sister-in-law, both of NOAA's hydrographic survey vessels on the East coast, the RUDE and the WHITING, were instrumental in search and recovery operations. Due to the uncertainty of the crash and the large potential debris field, the Office of Response and Restoration in the National Ocean Service was called upon to aid in pin-pointing potential search sites. This group, using its expertise in oil spill modeling, did a reverse forecast, or "hindcast" based upon the location of floating or beached debris to provide the highest probability areas for searching for the missing aircraft. The tightly defined search area recommended by the group contained the wreckage and contributed directly to the rapid location and recovery. The group also eliminated false search areas by assigning low probabilities to other non-crash related debris recovered.

Survey operations consisted of six mile long lines being run in an approximate east-west direction spaced less than 200 meters apart to ensure 100% coverage of the seafloor. The U.S. Coast Guard Cutter WILLOW, which was also at the scene, was equipped with an analog dual frequency EdgeTech 595 side scan and the WHITING operated a Klein T5500, the latest, state-of-the-art high speed high resolution side scan sonar. The WHITING's T5500 high frequency (500kHz) and phased-array projector allows it to produce extremely high resolution images of the seafloor while being towed at a speed nearly twice that of conventional side scans.

The Federal Aviation Administration (FAA) provided updated calculations of the final radar positions of the plane and National Transportation Safety Board (NTSB) and the FAA presented their best estimate of the impact site. Using this information and the modeling provided by the Office of Response and Restoration, the RUDE detected a sonar target that was suspected to be the wreckage. The side scan image was somewhat blurred but was in stark contrast to the sonar return from the surrounding sandy seafloor. WHITING's high resolution side scan sonar was then needed to be towed over the site in order to yield a much clearer image since the RUDE did not have the same side scan capability. The RUDE's multibeam sonar was then used to precisely locate the contact and she dropped a marker buoy on the site. The Navy's rescue and salvage ship USS GRASP used its Remote Operated Vehicle (ROV) to confirm that the contact was indeed the wreckage of the Piper Saratoga and that RUDE's marker buoy marked the exact spot of the wreckage. The U.S. Coast Guard formally recognized NOAA's service during this tragedy with a U.S.

Coast Guard Unit Commendation for employees of NOAA's Offices of Coast Survey and Response and Restoration.

Given the high degree of aid NOAA has been able to supply during these times of crisis, when EgyptAir Flight 990 went down October 31st, NOAA was again called to provide help in search and locating operations. The WHITING responded to work on providing the needed information for locating any debris. The high-speed side scan sonar on the WHITING will be an important part in determining the location of any debris. The WHITING is out there now working with Navy, Coast Guard and others to find all the information possible. Marine weather forecasts, which have been such a large factor in these recovery efforts, are also being supplied by NOAA to ensure that the response is taking advantage of all available windows for search efforts. NOAA is providing support and information on how to work with local lobstermen who have a number of lobster pots in the crash area to ensure that the recovery efforts are not compromised. Oceanographers will work with divers on scene to provide real-time coverage of currents throughout the water column. Using a portable Acoustic Doppler Profiler (ADCP) and attaching it to the side of a recovery ship, NOAA will be able to provide support for diving and other recovery operations through precise current speed, direction, and depth at the wreckage site.

A few years ago, the National Ocean Service (NOS), which contains the Offices of Coast Survey and of Response and Restoration, developed a response plan for our programs to initiate following natural disasters, especially hurricanes which tend to severely impact the coast where we have our primary focus. Following the work we did to support recovery efforts for TWA Flight 800 and the crash of John F. Kennedy, Jr.'s plan, NOS expanded this plan to include policy and procedures needed following events like these. When called upon for aid for recovery of EgyptAir Flight 990 by the NTSB and Coast Guard, NOS used this plan to respond in the most effective way possible and to bring all necessary resources to bear.

NOAA has been able to provide such high quality work in response to these disasters because our crews and ships are doing this type of work to support hydrographic surveying 10 months a year. The surveying has given NOAA employees enormous expertise and experience in locating and identifying obstructions and wreckage in navigational channels. Our employees have been able to apply these skills during these emergencies and helped obtain the information needed during the initial critical hours of recovery, as well as longer term efforts.

Ensuring the best capability available

One of NOAA's core missions is to promote safe navigation, which includes surveying the Nation's waters and providing accurate nautical charts in support of the economic and environmental well-being of this Nation. The resources NOAA uses to fulfill its missions, including people, vessels, and equipment, also support the national response to various emergencies. Both the NOAA Ship WHITING and NOAA Ship RUDE provided technical assistance in locating and mapping the debris fields for TWA 800, JFK, Jr, and now EgyptAir 990. A third smaller NOAA hydrographic vessel, the BAY HYDROGRAPHER, primarily working closer to shore, could also be pressed into service if needed. As mentioned previously, only the WHITING is currently equipped with the high speed high resolution side scan sonar (HSHRSS sonar) and it lacks the multibeam capability that the RUDE has on board. The RUDE, which has an aging, outdated multibeam capability, lacks the latest high speed, high resolution sonar that the WHITING has. Both capabilities are important to ensure the most accurate nautical charts.

As you know, for the past several years and continuing today, NOAA has been prohibited in the FY 1996 appropriations language and continuing through FY 2000 from upgrading our fleet, equipment, and vessels. NOAA has been prevented from using funds to modernize its fleet due to the fact that NOAA has been directed to increase its reliance on contracted services. An exception was made in FY 1998 allowing NOAA to outfit the RAINIER which operates primarily in Alaska. The result is that NOAA itself cannot employ the best available technology in carrying out its core missions or its response to emergencies.

The addition of the HSHRSS sonar has increased survey production of WHITING by approximately 75 percent in obtaining hydrographic data. The addition of the same technology to the RUDE would increase its productivity by approximately the same amount. By adding the multibeam capability to the WHITING launch, it would improve greatly the efficiency with which discovered dangers can be precisely characterized. NOAA is working to establish full-bottom sonar coverage as the standard for hydrographic data collection. Full-bottom coverage is obtained using multibeam sonar, side scan sonar or a combination of the two. These upgrades would ensure greater efficiency in achieving our core mission, and also provide NOAA with the latest technology and ability to respond in any future emergencies.

At the current level of effort and with present capabilities, NOAA will not be able to provide up-to-date nautical charts for all the critical areas of the country for another 20 years. This is in addition to the backlog on shoreline information and the electronic nautical charts, both of which are integral parts to ensuring safe navigation. NOAA has been working with our constituents and Congress to come up with a viable plan to address the issues of the survey backlog while balancing the role of the government in ensuring the health and welfare of our citizens with the role and capabilities of the private sector. NOAA's Long Term Hydrographic Data Acquisition Plan, using information gathered and recommendations by an independent group and sent to Congress this past spring, affirms that NOAA should maintain up-to-date-technology on our ships to ensure that data acquisition is done in the most efficient and accurate way possible.

As this Committee recognized last year when it passed the Hydrographic Services Act of 1998, it is vitally important for NOAA to maintain a high level of expertise in hydrographic data acquisition and hydrographic services. NOAA is presently working on plans for maintaining our long term expertise in these areas, including the personnel and platforms needed. We have again retained an independent consultant to gather the necessary information, perform analysis, and identify options on how to best accomplish this. This effort will include how best to address the issue of replacing the extensive expertise and experience that is provided by NOAA's aging hydrographic survey vessels. These reports will be delivered to Congress when completed.

In summary, NOAA needs to ensure that we maintain our ability to carry out our core mission and function, as well as provide support in times of crisis. One of the ways this can be accomplished is by getting the latest technology for our hydrographic survey ships. NOAA hopes that we never need to be called on again for such a tragedy, but stands ready to respond if called upon to do so.

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